



(11) **EP 4 414 183 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
04.12.2024 Bulletin 2024/49

(43) Date of publication A2:
14.08.2024 Bulletin 2024/33

(21) Application number: **24186066.7**

(22) Date of filing: **17.04.2020**

(51) International Patent Classification (IPC):
C08L 7/00 ^(2006.01) **B60C 1/00** ^(2006.01)
C08K 3/04 ^(2006.01) **C08L 9/00** ^(2006.01)
C08L 9/06 ^(2006.01) **B60C 11/00** ^(2006.01)

(52) Cooperative Patent Classification (CPC):
(C-Sets available)
B60C 1/0016; B60C 2011/0016; B60C 2200/06;
C08K 2201/005; C08K 2201/006; Y02T 10/86

(Cont.)

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **17.05.2019 JP 2019093743**

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
20170230.5 / 3 738 998

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(54) **TREAD RUBBER COMPOSITION AND TIRE**

(57) A tread rubber composition and a tire that have excellent block chipping resistance and wear resistance are provided. The tread rubber composition contains a rubber component including an isoprene-based rubber, a butadiene rubber, and a styrene-butadiene rubber, and a carbon black having an average particle diameter not

greater than 20 nm and/or a cetyltrimethylammonium bromide adsorption specific surface area not less than 130 m²/g, an amount of the isoprene-based rubber in 100% by mass of the rubber component is not less than 56% by mass, and the rubber composition satisfies hardness (Hs) ≥ 72 and elongation at break (EB) ≥ 420%.

EP 4 414 183 A3

(52) Cooperative Patent Classification (CPC): (Cont.)

C-Sets

**C08L 7/00, C08L 9/00, C08L 9/06, C08L 91/06,
C08K 3/04, C08K 5/09, C08K 3/22, C08K 3/06,
C08K 5/18, C08K 5/47;
C08L 7/00, C08L 9/06, C08L 9/00, C08L 91/06,
C08K 3/04, C08K 5/09, C08K 3/22, C08K 3/06,
C08K 5/18, C08K 5/47**



EUROPEAN SEARCH REPORT

Application Number

EP 24 18 6066

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	JP 2018 150420 A (SUMITOMO RUBBER IND) 27 September 2018 (2018-09-27) * the whole document *	1-9	INV. C08L7/00 B60C1/00 C08K3/04
A	WO 94/19412 A1 (CABOT CORP) 1 September 1994 (1994-09-01) * tables 1-13 *	1-9	C08L9/00 C08L9/06 B60C11/00
A,P	EP 3 632 702 A1 (SUMITOMO RUBBER IND [JP]) 8 April 2020 (2020-04-08) * Comparative Examples 2,4,5; paragraphs [0119], [0120]; table 2 *	1-9	
A	EP 2 444 257 A1 (BRIDGESTONE CORP [JP]) 25 April 2012 (2012-04-25) * paragraph [0008] - paragraph [0017]; figures 1-4 *	1-9	
A	US 2018/134079 A1 (MIYAZAKI TATSUYA [JP]) 17 May 2018 (2018-05-17) * tables 1-1,1-2,1-3,2-1,2-2,2-3 *	1-9	TECHNICAL FIELDS SEARCHED (IPC)
A	EP 2 995 644 A1 (SUMITOMO RUBBER IND [JP]) 16 March 2016 (2016-03-16) * paragraph [0072]; examples 6,7; table 2 *	1-9	C08L C08K B60C
A,P	EP 3 546 512 A1 (SUMITOMO RUBBER IND [JP]) 2 October 2019 (2019-10-02) * page 7, lines 2-3; examples 1-4; table 1 *	1-9	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 October 2024	Examiner Barker, Stephan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ON EUROPEAN PATENT APPLICATION NO.**

EP 24 18 6066

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22-10-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2018150420 A	27-09-2018	JP 6897176 B2 JP 2018150420 A	30-06-2021 27-09-2018
WO 9419412 A1	01-09-1994	AU 674066 B2 BR 9405696 A CA 2155194 A1 CZ 289948 B6 DE 69412075 T2 EP 0686174 A1 ES 2119180 T3 HU 214211 B JP 3778562 B2 JP H08507555 A PH 31156 A PL 310356 A1 RU 2126432 C1 TR 27561 A WO 9419412 A1	05-12-1996 21-11-1995 01-09-1994 15-05-2002 15-04-1999 13-12-1995 01-10-1998 28-01-1998 24-05-2006 13-08-1996 20-03-1998 11-12-1995 20-02-1999 08-06-1995 01-09-1994
EP 3632702 A1	08-04-2020	EP 3632702 A1 JP 7110887 B2 JP 2020055427 A	08-04-2020 02-08-2022 09-04-2020
EP 2444257 A1	25-04-2012	BR PI1013115 A2 CN 102802966 A EP 2444257 A1 JP 6043483 B2 JP WO2010147076 A1 US 2012168048 A1 WO 2010147076 A1	20-03-2018 28-11-2012 25-04-2012 14-12-2016 06-12-2012 05-07-2012 23-12-2010
US 2018134079 A1	17-05-2018	CN 107614590 A EP 3299411 A1 US 2018134079 A1 WO 2016199555 A1	19-01-2018 28-03-2018 17-05-2018 15-12-2016
EP 2995644 A1	16-03-2016	CN 105408410 A EP 2995644 A1 JP 6010060 B2 JP 2015157878 A US 2016122518 A1 WO 2015125538 A1	16-03-2016 16-03-2016 19-10-2016 03-09-2015 05-05-2016 27-08-2015
EP 3546512 A1	02-10-2019	CN 110023395 A EP 3546512 A1 JP 7139947 B2	16-07-2019 02-10-2019 21-09-2022

EPO FORM P0459

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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 24 18 6066

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The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-10-2024

10	Patent document cited in search report	Publication date	Patent family member(s)	Publication date
			JP WO2018097066 A1	17-10-2019
			US 2019382562 A1	19-12-2019
			WO 2018097066 A1	31-05-2018
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82